North Miami-Dade County Ground Water Flow Model

Introduction

The North Miami-Dade County Ground Water Flow Model, sometimes referred to as version 3.0 of the Lake Belt ground water flow model, is the third in a series of ground water flow models developed for applications in northern Miami-Dade County. The first, version 1.0 of the Lake Belt ground water flow model (Wilsnack, 1995), was developed in support of the *Interim Plan for Lower East Coast Regional Water Supply* (SFWMD, 1998). The second, version 2.0 (Wilsnack et al., 1997; Wilsnack and Nair, 1998), was developed in support of the *Northwest Dade County Freshwater Lake Plan* (SFWMD, 1996). These two older versions of the model are no longer used by the District and are superseded by version 3.0. This current version is the first to include capabilities for simulating certain key surface water processes and was developed in support of both the Restudy and the LEC regional water supply planning effort.

Figure F-9 depicts the active model domain in relation to the predominant features of this area. The model domain was discretized horizontally using a finite-difference grid consisting of 328 rows, 364 columns, and 500-foot square cells. A subset of the active model domain was defined where the model results of planning based applications could be used for decisionmaking purposes.

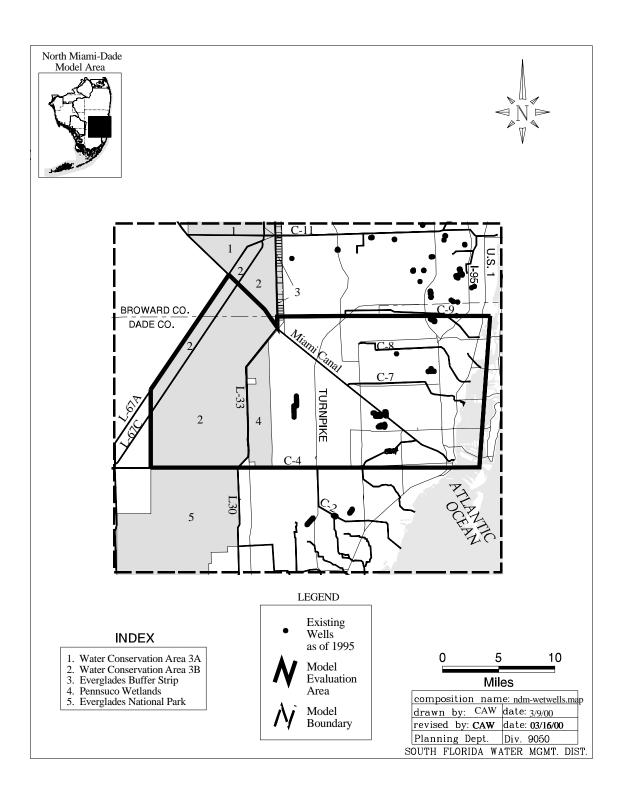


Figure F-9. Model Boundaries and Major Features of the North Miami-Dade County Ground Water Flow Model.

Physical Features

Hydrogeology and Model Layers

Only the SAS was included in the North Miami-Dade County Ground Water Model. The SAS within northern Miami-Dade County essentially consists of (in order of increasing depth) shallow sediments; the Miami Limestone (formerly referred to as the Miami Oolite); the Fort Thompson formation (which includes the Biscayne aquifer); the upper semiconfining unit of the Tamiami formation; the Gray Limestone aquifer; and the lower clastic sediments of the Tamiami formation. Deviations from this general sequence of units, however, can occur in the extreme eastern and western portions of the model domain. For further details, see Fish and Stewart (1991).

The vertical discretization of the SAS consists of eight model layers: a wetland layer (where extensive wetlands exist) extending from the wetland water surface down to an elevation of zero ft NGVD; a top aquifer layer extending from either the bottom of the wetland layer or land surface to an elevation of –10 ft NGVD; three middle layers with a constant thickness of 20 feet; and three deep layers with a constant thickness of 30 feet. In order to minimize disk space requirements and model execution times, the two bottommost layers were later combined into one layer, resulting in a total of seven model layers used in model calibration and applications.

Recharge and Evapotranspiration

The models used to simulate recharge and evapotranspiration are discussed in the General Subregional Model Features section earlier in this appendix. The stations used for the North Miami-Dade County Ground Water Flow Model are presented in **Figure F-10**.

Canals

Included within the model are all or portions of the following District canals: C-1W, C-1N, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, C-11, the C-100 canals, C-123, C-304, L-29, L-30, L-31N, L-33, L-67A, and L-67EXT (**Figure F-9**). In addition, numerous secondary canals owned and operated by Miami-Dade Department of Environmental Resource Management (DERM) are also contained within the model domain. This includes the canal system which protects the Northwest Wellfield. Water levels in all of these canals are controlled and maintained by a network of District and Miami-Dade DERM water control structures.

Canal-aquifer interactions are included in the model through use of the River and Drain packages. Canals were classified as either rivers or drains depending on their physical and operational properties. Most of the canals were classified as rivers. In either case, the required input data included canal stages along with conductance terms depicting the degree of hydraulic interaction between the canals and the aquifer. Canal stages were assigned to the various canal reaches by using measured water levels at stage monitoring stations to estimate hydraulic grade line elevations within each reach.

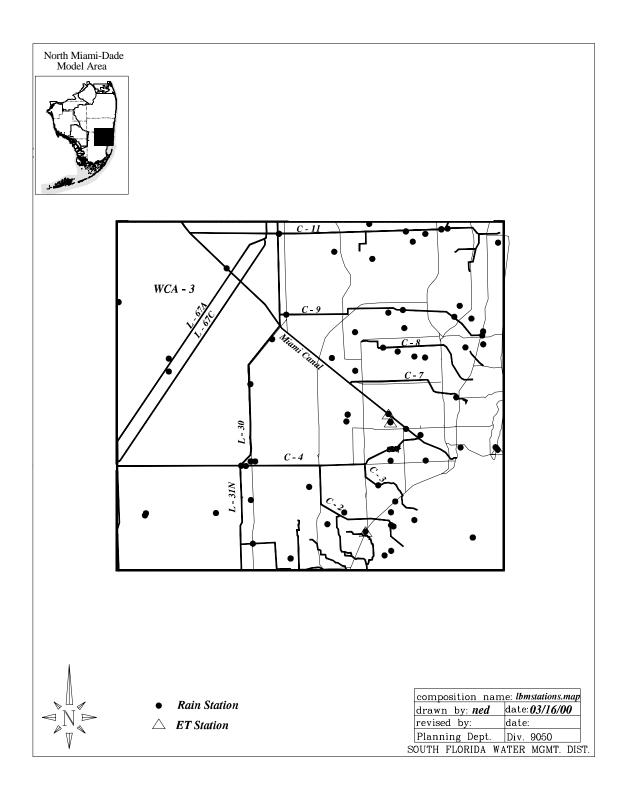


Figure F-10. Rainfall and Evapotranspiration Station Locations used in the North Miami-Dade Ground Water Flow Model.

Wetlands

The major wetland systems within the active model area include WCA-3A, WCA-3B, the northeast corner of Everglades National Park, the Pennsuco Wetlands, and the Bird Drive Wetland (**Figure F-9**). Surface water elevations within these wetlands are influenced by ground water levels, structure discharges, rainfall, ET, and topography.

The Wetlands package (Restrepo et al., 1998) was used to simulate overland flow within the wetland systems along with interactions between the surface water and ground water. In this case, the option to include both ponded surface water and shallow geology within the wetland layer (Restrepo and Montoya, 1997) was used in order to both minimize the number of model layers, and to avoid the periodic drying of cells. As mentioned previously, this includes all of the sediments and stratigraphic units between land surface and zero ft NGVD. This latter elevation was chosen since it is typically within the range of elevations where the dense limestone layers of the Miami Limestone and upper Fort Thompson formation are situated (Krupa, 1997). These shallow layers, where present, can have a significant influence on interactions between ground water and surface water (Klein and Sherwood, 1961).

Water Use

Most of the ground water withdrawals in northern Miami-Dade County are for PWS purposes and occur at the wellfield locations shown in **Figure F-9**. Pumpage for golf course irrigation and local domestic supplies also occurs at various locations. The primary source of PWS in this region is the Biscayne aquifer, although withdrawals from the gray limestone aquifer also occur at certain wellfields located within the western portions of the model domain (e.g., the Northwest Wellfield).

Daily pumpage from major wellfields within Miami-Dade County was estimated over the 1993-94 period of record. These estimates were based on wellfield operation records maintained by the Miami-Dade Water and Sewer Department (WASD) along with pump capacities. Estimates of daily pumpage based on these data, however, will generally be too high since head losses incurred within the water distribution system are not taken into account. For this reason, the resulting pumpage rates were reduced during the model calibration process.

Daily pumpage was not estimated over the 1988-89 calibration period of record. Instead, information contained in monthly water use reports submitted to the District was used to assign monthly pumpage rates to each water use permit. The resulting mean daily pumpage for each permit was then divided among its wells according to a specified percentage for each well.

Quarries

The region within northern Miami-Dade County commonly known as the Lake Belt can be seen in **Figure F-11**, where the January 1994 mining configuration is compared with the 1988 mining configuration. Located within this area are numerous

limestone mining quarries that typically range from about 30 to 80 feet in depth. These quarries can generally be characterized as having very steep (nearly vertical) side walls that are in direct contact with the aquifer. Input data sets to the Lake package were constructed so as to reflect this conceptualization of the quarries.

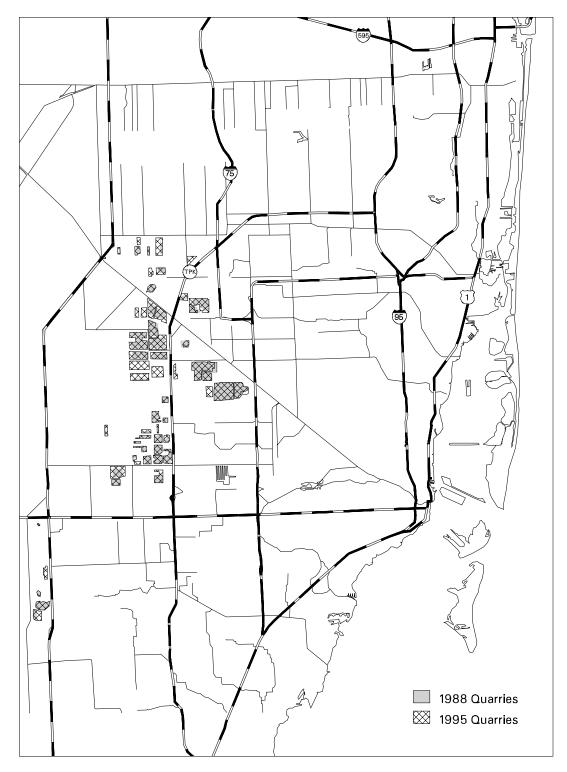


Figure F-11. Quarries Located Within the Lake Belt in 1988 and 1994.

Features of the Outer Boundary

As shown in **Figure F-1**, the portion of the outer model boundary located east of the levees consists of:

- A coastal boundary
- A northern boundary located along the C-11 Canal
- A southern boundary that contains portions of the C-1W, C-1N, C-100, and C-100A canals

Each of these boundaries was incorporated into the model using the General Head Boundary package. Along the coastal boundary, the required stages and conductance values were determined in the manner explained earlier in this appendix. Along the northern and southern boundaries, stages were based on water levels in canals while the conductance terms were computed in each model layer using the hydraulic conductivity values and dimensions of the boundary cells.

West of the levee system, the boundary traverses portions of WCA-3A, the L-67A Borrow Canal, the L-67EXT Borrow Canal, and Everglades National Park (**Figure F-9**). The conductance values for these sections of the model boundary were based on the same information used to compute conductance values along the northern and southern boundaries. Boundary stages applied west of the levee system were the closest available measured stages.

Model Calibration

The periods of record selected for history matching were 1988-89 (relatively dry hydrologic conditions) and 1993-94 (relatively wet hydrologic conditions). For each of these periods of record, the objectives for the history matching consist of the following:

- Comparing measured and computed water levels at monitoring sites and adjusting model parameters as appropriate to reduce errors to an acceptable level (Phase I)
- Comparing measured and computed base flows of selected canal reaches and adjusting model parameters as appropriate to reduce errors to an acceptable level while maintaining water level errors within an acceptable level (Phase II)

Given the time frame for completing the model applications needed to support the LEC Plan, only the Phase I calibration goals were attempted. Phase II of the calibration will be completed at a later date.

Differences between computed and observed water levels are summarized in **Table F-9** for the wet period of record while **Table F-10** contains the water level residuals for the dry period of record. Also provided are mean error, or bias, and residual standard deviation for each site. In order to minimize any effects of initial conditions on these

results, the residuals for the first two months of each period of record were not used in the analysis.

It is important to note that the statistics for each gage are based on the measured water level data available at that site within the calibration period of record. At some gages, data only exist over a fraction of the total period of record and result in statistics that may not be indicative of model accuracy over the entire period of record. Furthermore, the measured ground water levels are the daily maximum values (the only ground water levels published by the USGS) at each site and may not always be close to observed end-of-day ground water levels. In contrast, the model computes water levels at the end of each time step (i.e., day). Additionally, one can generally not expect a finite-difference based model to replicate ground water levels observed in the immediate vicinity of a pumping well due to limitations imposed by the spatial resolution of the model. Similarly, limitations in boundary conditions can affect model results at sites located near the boundaries. Finally, it should be emphasized that the calibration results depicted in **Tables F-9** and **F-10** only reflect the current status of the model and are subject to change as improvements to the model are made.

Table F-9. North Miami-Dade County Calibration Statistics for the Wet Period of Record (1993-94).

	Percent of Days				
Gage Name	Within Minimum Criterion (+/- 1.0 ft)	Within Desired Criterion (+/- 0.5 ft)	Mean Error (Bias) (feet)	Standard Deviation (feet)	Notes
3B-SE_B	100.00	71.46	-0.29	0.37	Surface water station
F-179	98.77	95.28	0.05	0.29	
F-239	92.64	27.71	0.61	0.36	Elevation of measuring point may be questionable
F-291	98.08	81.06	0.22	0.36	
F-319	99.78	96.53	-0.16	0.18	
F-45	98.36	81.52	0.16	0.37	
G-1074B	0.00	0.00	5.23	0.93	Within the Alexander Orr Wellfield Complex
G-1166	98.96	95.41	-0.00	0.22	
G-1223	95.89	64.48	-0.49	0.30	Located near the northern boundary
G-1224	94.39	29.11	-0.63	0.24	Located near the northeast boundary and a wellfield
G-1225	95.77	71.13	-0.32	0.37	See Note 1
G-1226	97.20	31.83	-0.59	0.26	Located near the northeast boundary and a wellfield
G-1359	99.33	63.33	-0.28	0.37	Period of Record (POR) starts 8/1/94; located near a mining lake
G-1368A	16.20	14.07	3.26	1.60	Located within Preston-Hialeah/Miami Springs Wellfield
G-1473	98.15	81.31	0.14	0.39	
G-1487	99.58	62.92	-0.46	0.20	Located near the southern boundary; See Note 1

Note 1. A possible error occurred in the measuring point datum, or maximum daily measured water levels (published) may not be representative of end-of-day water levels (computed by the model and measured values not published).

Note 2. A discrepancy exists between the SFWMD and USGS surveyed elevation of the measuring point.

Note 3. A possible overestimation of pumping rates was made at nearby pumping well(s).

Table F-9. North Miami-Dade County Calibration Statistics for the Wet Period of Record (1993-94). (Continued)

G-1636 96.57 69.38 -0.32 0.35 See Note 1 G-1637 100.00 78.19 0.31 0.21 G-2034 93.50 82.06 -0.16 0.43 G-2035 70.12 5.30 -0.93 0.33 Located near the northeast boundary and a wellfield G-2495 57.69 11.54 -0.94 0.37 Located near the northern boundary G-3 10.27 1.44 1.48 0.43 Located within Preston-Hialeah-Miami Springs Wellfield G-3073 92.45 71.91 0.33 0.41 Influenced by pumping G-3073 92.45 71.91 0.33 0.41 Influenced by pumping G-3074 48.46 31.42 1.31 1.31 Located near the PWS well within the Snapper Creek Complex G-3253 76.34 39.43 -0.06 0.80 Located within Northwest Wellfield Complex; See Notes 2 and 3 G-3259A 80.90 46.61 -0.53 0.45 Located near the Northwest Wellfield Complex; See Notes 2 and 3 G-3259A 99.18 97.33 -0.05 0.22 G-3327 99.18 97.33 -0.05 0.23 G-3328 100.00 97.85 -0.00 0.20 G-3329 98.45 91.61 -0.14 0.43 G-3463 99.72 95.25 -0.11 0.21 G-3466 67.85 27.25 0.74 0.46 Located near the Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23 G-3467 99.18 96.10 0.11 0.23 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 98.85 0.04 0.25 G-3554 99.75 94.38 0.06 0.28 G-3555 99.28 89.93 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.79 0.07 0.17 G-3560 99.27 92.26 0.15 0.26 G-3560 99.24 53.77 -0.08 0.65 Located near the southern boundary; POR begins 2/94 G-3561 90.45 53.77 -0.08 0.65 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1		Percent	of Days			
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G-3	G-2035	70.12	5.30	-0.93	0.33	Located near the northeast boundary and a wellfield
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G-3074	G-3	10.27	1.44	1.48	0.43	Located within Preston-Hialeah-Miami Springs Wellfield
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G-3259A 80.90 46.61 -0.53 0.45 Located near the Northwest Wellfield Complex; See Notes 2 and 3 G-3264A 100.00 87.27 0.25 0.22 G-3327 99.18 97.33 -0.05 0.23 G-3328 100.00 97.85 -0.00 0.20 G-3329 98.45 91.61 -0.14 0.43 G-3439 99.72 95.25 -0.11 0.21 G-3465 99.37 47.47 0.44 0.33 Located near the Preston-Hialeah/Miami Springs Wellfield G-3466 67.85 27.25 0.74 0.46 Located within Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 </td <td>G-3074</td> <td>48.46</td> <td>31.42</td> <td>1.31</td> <td>1.18</td> <td></td>	G-3074	48.46	31.42	1.31	1.18	
G-3264A 100.00 87.27 0.25 0.22 G-3327 99.18 97.33 -0.05 0.23 G-3328 100.00 97.85 -0.00 0.20 G-3329 98.45 91.61 -0.14 0.43 G-3439 99.72 95.25 -0.11 0.21 G-3465 99.37 47.47 0.44 0.33 Located near the Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23 G-3467 99.18 96.10 0.11 0.23 G-3473 99.13 92.16 -0.12 0.24 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3556 100.00 99.33 0.03 0.21 G-3558 100.00 99.33 0.03 0.21 G-3558 100.00 99.34 0.05 0.24 G-3559 100.00 98.48 -0.05 0.24 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3253	76.34	39.43	-0.06	0.80	
G-3327 99.18 97.33 -0.05 0.23 G-3328 100.00 97.85 -0.00 0.20 G-3329 98.45 91.61 -0.14 0.43 G-3439 99.72 95.25 -0.11 0.21 G-3465 99.37 47.47 0.44 0.33 Located near the Preston-Hialeah/Miami Springs Wellfield G-3466 67.85 27.25 0.74 0.46 Located within Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23 G-3467 99.18 96.10 0.11 0.23 G-3467 99.18 92.16 -0.12 0.24 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3552 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 99.36 0.05 0.24 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3259A	80.90	46.61	-0.53	0.45	•
G-3328	G-3264A	100.00	87.27	0.25	0.22	
G-3329 98.45 91.61 -0.14 0.43 G-3439 99.72 95.25 -0.11 0.21 G-3465 99.37 47.47 0.44 0.33 Located near the Preston-Hialeah/Miami Springs Wellfield G-3466 67.85 27.25 0.74 0.46 Located within Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23 G-3473 99.13 92.16 -0.12 0.24 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 99.37 0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3327	99.18	97.33	-0.05	0.23	
G-3439 99.72 95.25 -0.11 0.21 G-3465 99.37 47.47 0.44 0.33 Located near the Preston-Hialeah/Miami Springs Wellfield G-3466 67.85 27.25 0.74 0.46 Located within Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23 G-3473 99.13 92.16 -0.12 0.24 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3328	100.00	97.85	-0.00	0.20	
G-3465 99.37 47.47 0.44 0.33 Located near the Preston-Hialeah/Miami Springs Wellfield G-3466 67.85 27.25 0.74 0.46 Located within Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23 G-3473 99.13 92.16 -0.12 0.24 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3329	98.45	91.61	-0.14	0.43	
Wellfield G-3466 67.85 27.25 0.74 0.46 Located within Preston-Hialeah/Miami Springs Wellfield G-3467 99.18 96.10 0.11 0.23	G-3439	99.72	95.25	-0.11	0.21	
G-3467 99.18 96.10 0.11 0.23 G-3473 99.13 92.16 -0.12 0.24 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3465	99.37	47.47	0.44	0.33	
G-3473 99.13 92.16 -0.12 0.24 G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3466	67.85	27.25	0.74	0.46	Located within Preston-Hialeah/Miami Springs Wellfield
G-3551 100.00 100.00 0.03 0.15 G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3467	99.18	96.10	0.11	0.23	
G-3552 98.91 92.36 -0.00 0.30 G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3473	99.13	92.16	-0.12	0.24	
G-3553 99.36 95.85 0.04 0.25 G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3551	100.00	100.00	0.03	0.15	
G-3554 98.75 94.38 -0.02 0.31 G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3552	98.91	92.36	-0.00	0.30	
G-3555 99.28 89.53 0.16 0.28 G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3553	99.36	95.85	0.04	0.25	
G-3556 100.00 99.33 0.03 0.21 G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3554	98.75	94.38	-0.02	0.31	
G-3557 100.00 98.48 -0.05 0.24 G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3555	99.28	89.53	0.16	0.28	
G-3558 100.00 92.66 -0.10 0.23 G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3556	100.00	99.33	0.03	0.21	
G-3559 100.00 98.79 -0.07 0.17 G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3557	100.00	98.48	-0.05	0.24	
G-3560 99.27 92.36 0.15 0.26 See Notes 2 G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3558	100.00	92.66	-0.10	0.23	
G-3561 92.45 53.77 -0.08 0.63 Located near the southern boundary; POR begins 2/94 G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3559	100.00	98.79	-0.07	0.17	
G-3562 31.97 29.51 -1.26 0.89 POR begins 9/1/94; See Note 1	G-3560	99.27	92.36	0.15	0.26	See Notes 2
	G-3561	92.45	53.77	-0.08	0.63	Located near the southern boundary; POR begins 2/94
G-3563 96.69 74.38 -0.39 0.29	G-3562	31.97	29.51	-1.26	0.89	POR begins 9/1/94; See Note 1
	G-3563	96.69	74.38	-0.39	0.29	

Note 1. A possible error occurred in the measuring point datum, or maximum daily measured water levels (published) may not be representative of end-of-day water levels (computed by the model and measured values not published).

Note 2. A discrepancy exists between the SFWMD and USGS surveyed elevation of the measuring point.

Note 3. A possible overestimation of pumping rates was made at nearby pumping well(s).

Table F-9. North Miami-Dade County Calibration Statistics for the Wet Period of Record (1993-94). (Continued)

	Percent	of Days			
Gage Name	Within Minimum Criterion (+/- 1.0 ft)	Within Desired Criterion (+/- 0.5 ft)	Mean Error (Bias) (feet)	Standard Deviation (feet)	Notes
G-3564	90.16	41.80	0.45	0.57	POR begins 9/1/94; See Note 1
G-3565	93.39	16.53	-0.66	0.23	POR begins 9/1/94; See Note 1
G-3566	94.26	85.25	-0.18	0.47	
G-3567	100.00	71.31	-0.23	0.43	POR begins 9/1/94; See Note 2
G-3568	99.11	91.07	0.24	0.30	
G-3570	60.33	10.74	-1.05	0.60	POR begins 9/1/94; See Note 1
G-3571	91.18	75.00	-0.05	0.78	
G-3572	97.52	70.25	-0.35	0.31	POR begins 9/1/94; See Note 1
G-551	86.45	23.00	-0.46	0.59	Located within the Southwest Wellfield Complex; See Note 3
G-553	99.15	75.21	-0.46	0.14	
G-580	98.53	94.55	-0.11	0.33	
G-618	100.00	89.62	0.33	0.14	
G-852	97.69	92.61	-0.07	0.33	
G-855	97.26	88.81	0.23	0.28	
G-968	100.00	90.61	-0.10	0.25	See Note 2
G-970	99.76	92.40	-0.25	0.18	
G-972	97.73	64.77	0.07	0.50	
G-973	100.00	90.70	0.28	0.21	
G-975	100.00	87.60	0.12	0.30	
G-976	100.00	78.98	-0.32	0.22	
NESRS1	100.00	57.70	0.45	0.21	Surface water station; located near southwest boundary
NESRS2	99.79	19.71	0.63	0.21	Surface water station
NESRS3_B	100.00	100.00	-0.22	0.15	Surface water station
S-18	97.55	92.87	-0.14	0.31	
S-19	99.59	48.76	0.44	0.32	Located within Preston-Hialeah/Miami Springs Wellfield
S-68	33.04	9.13	1.18	0.46	Located within Preston-Hialeah/Miami Springs Wellfield
SHARK.1_H	100.00	58.59	0.38	0.25	Surface water station
SITE_34	100.00	92.81	-0.04	0.26	Surface water station
SITE_71	100.00	30.39	0.64	0.22	Surface water station
SITE_76	100.00	56.46	0.46	0.19	Surface water station
Note 1 A pe	onible error	accurred in		·	datum or maximum daily macaurad water layela

Note 1. A possible error occurred in the measuring point datum, or maximum daily measured water levels (published) may not be representative of end-of-day water levels (computed by the model and measured values not published).

Note 2. A discrepancy exists between the SFWMD and USGS surveyed elevation of the measuring point.

Note 3. A possible overestimation of pumping rates was made at nearby pumping well(s).

Table F-10. North Miami-Dade County Calibration Statistics for the Dry Period of Record (1988-89).

Gage Name Within Minimum Criterion (vf- 1.0 rf) Within Minimum Criterion (vf- 2.0 rf) Wean Error (vf- 9.0 rf) Standard (vf		Percent	of Days			
F-179	_	Minimum Criterion	Desired Criterion	Error		Notes
F-299	3B-SE_B	100.00	87.16	-0.28	0.19	Surface water station
F-291 97.54 78.85 0.31 0.30 F-319 99.18 95.69 -0.10 0.19 F-45 100.00 93.84 0.17 0.17 G-1074B 15.20 7.8 2.77 2.25 Within the Alexander Orr Wellfield Complex; See Note 4 G-1166 100.00 100.00 0.13 0.10 0.60 G-1222 94.58 76.92 0.04 0.52 0.61 G-1223 99.59 74.33 -0.44 0.15 Located near the northeast boundary G-1224 97.13 86.24 -0.30 0.29 Located near the northeast boundary and a wellfield G-1226 97.13 60.99 -0.48 0.48 Located near the northeast boundary and a wellfield G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 G-1472 97.74 86.24 0.24 0.31 Located near the southern boundary G-1487 93.43 71.46 -0.36 0.37 Located	F-179	99.79	87.27	0.07	0.28	
F-319	F-239	85.01	4.52	0.82	0.19	Elevation of measuring point may be questionable
F-45 100.00 93.84 0.17 0.17 G-1074B 15.20 7.8 2.77 2.25 Within the Alexander Orr Wellfield Complex; See Note 4 G-1166 100.00 100.00 0.13 0.10 G-1222 94.58 78.92 0.04 0.52 G-1223 99.59 74.33 -0.44 0.15 Located near the northeast boundary G-1224 97.13 86.24 -0.30 0.29 Located near the northeast boundary and a wellfield G-1225 100.00 94.87 0.24 0.20 G-1226 97.13 60.99 -0.48 0.48 Located near the northeast boundary and a wellfield G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 G-1472 97.74 86.24 0.24 0.31 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1	F-291	97.54	78.85	0.31	0.30	
G-1074B	F-319	99.18	95.69	-0.10	0.19	
See Note 4 See Note 4 See Note 4 See Note 4 See Note 4 See Note 4 See Note 4 See Note 4 See Note 4 See Note 5 See Note 6 See Note 6 See Note 7 See Note 7 See Note 8 See Note 8 See Note 9 See Note	F-45	100.00	93.84	0.17	0.17	
G-1222 94.58 78.92 0.04 0.52 G-1223 99.59 74.33 -0.44 0.15 Located near the northern boundary G-1224 97.13 86.24 -0.30 0.29 Located near the northeast boundary and a wellfield G-1225 100.00 94.87 0.24 0.20 G-1226 97.13 60.99 -0.48 0.48 Located near the northeast boundary and a wellfield G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 0.24 0.31 G-1472 97.74 86.24 0.24 0.31 G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northeast boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3074 42.30 36.14 0.95 0.84 Located near the northeast boundary and a wellfield G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 9 Notes 2 and 4	G-1074B	15.20	7.8	2.77	2.25	· · ·
G-1223 99.59 74.33 -0.44 0.15 Located near the northern boundary G-1224 97.13 86.24 -0.30 0.29 Located near the northeast boundary and a wellfield G-1225 100.00 94.87 0.24 0.20 G-1226 97.13 60.99 -0.48 0.48 Located near the northeast boundary and a wellfield G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 G-1472 97.74 86.24 0.24 0.31 G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located near the northeast boundary and a wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Note 4 O-235 and 4	G-1166	100.00	100.00	0.13	0.10	
G-1224 97.13 86.24 -0.30 0.29 Located near the northeast boundary and a wellfield G-1225 100.00 94.87 0.24 0.20 G-1226 97.13 60.99 -0.48 0.48 Located near the northeast boundary and a wellfield G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 G-1472 97.74 86.24 0.24 0.31 G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located near the northeast boundary and a wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Note 2 and 4	G-1222	94.58	78.92	0.04	0.52	
G-1225 100.00 94.87 0.24 0.20 G-1226 97.13 60.99 -0.48 0.48 Located near the northeast boundary and a wellfield G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 G-1472 97.74 86.24 0.24 0.31 G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northeast boundary and a wellfield G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Springs Wellfield G-3259A 91.17 37.78 0.44 0.47 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Note 2 and 4	G-1223	99.59	74.33	-0.44	0.15	Located near the northern boundary
G-1226 97.13 60.99 -0.48 0.48 Located near the northeast boundary and a wellfield G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 G-1472 97.74 86.24 0.24 0.31 G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Note 2 and 4	G-1224	97.13	86.24	-0.30	0.29	Located near the northeast boundary and a wellfield
G-1368A 69.40 54.62 0.70 0.86 Within Preston-Hialeah/Miami Springs Wellfield; See Note 4 G-1472 97.74 86.24 0.24 0.31 G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located ne	G-1225	100.00	94.87	0.24	0.20	
G-1472 97.74 86.24 0.24 0.31 G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex 5ee Note 4 0.47 Located near the Northwest Wellfield Complex; See Note 2 and 4	G-1226	97.13	60.99	-0.48	0.48	Located near the northeast boundary and a wellfield
G-1473 98.36 90.76 0.20 0.28 G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-1368A	69.40	54.62	0.70	0.86	· -
G-1487 93.43 71.46 -0.36 0.37 Located near the southern boundary G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-1472	97.74	86.24	0.24	0.31	
G-1488 100.00 69.61 -0.35 0.25 See Note 1 G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-1473	98.36	90.76	0.20	0.28	
G-1636 95.48 77.00 -0.20 0.42 G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-1487	93.43	71.46	-0.36	0.37	Located near the southern boundary
G-1637 99.79 97.54 0.18 0.19 G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-1488	100.00	69.61	-0.35	0.25	See Note 1
G-2034 94.05 74.95 0.04 0.50 Located near the northern boundary; See Note 4 G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-1636	95.48	77.00	-0.20	0.42	
G-2035 91.77 18.11 -0.73 0.25 Located near the northeast boundary and a wellfield G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-1637	99.79	97.54	0.18	0.19	
G-3 100.00 97.54 0.18 0.19 Located within Preston-Hialeah/Miami Springs Wellfield G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-2034	94.05	74.95	0.04	0.50	Located near the northern boundary; See Note 4
G-3074 42.30 36.14 0.95 0.84 Located near the PWS well within Snapper Creek Complex G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-2035	91.77	18.11	-0.73	0.25	Located near the northeast boundary and a wellfield
G-3253 21.97 9.45 1.61 1.02 Located within Northwest Wellfield Complex; See Note 4 G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-3	100.00	97.54	0.18	0.19	Located within Preston-Hialeah/Miami Springs Wellfield
G-3259A 91.17 37.78 0.44 0.47 Located near the Northwest Wellfield Complex; See Notes 2 and 4	G-3074	42.30	36.14	0.95	0.84	
Notes 2 and 4	G-3253	21.97	9.45	1.61	1.02	· · ·
G-3264A 98.97 94.66 -0.16 0.23	G-3259A	91.17	37.78	0.44	0.47	· · ·
	G-3264A	98.97	94.66	-0.16	0.23	

Note 1. A possible error occurred in the measuring point datum, or maximum daily measured water levels (published) may not be representative of end-of-day water levels (computed by the model and measured values not published).

Note 2. A discrepancy exists between the SFWMD and USGS surveyed elevation of the measuring point.

Note 3. A possible overestimation of pumping rates was made at nearby pumping well(s).

Note 4. The use of monthly pumpage rates may also be contributing to errors.

Table F-10. North Miami-Dade County Calibration Statistics for the Dry Period of Record (1988-89). (Continued)

	Vithin				
Gage Cri	nimum iterion - 1.0 ft)	Within Desired Criterion (+/- 0.5 ft)	Mean Error (Bias)	Standard Deviation	Notes
G-3327	100.00	86.65	0.37	0.15	
G-3328	100.00	97.95	0.29	0.10	
G-3329	99.79	96.71	-0.10	0.13	
G-3439	100.00	77.82	0.18	0.30	
G-3465	100.00	95.28	0.16	0.17	Located near the Preston-Hialeah/Miami Springs Wellfield
G-3466	99.79	87.27	0.34	0.20	Located within Preston-Hialeah/Miami Springs Wellfield
G-3467	100.00	88.09	0.36	0.15	
G-551	66.59	7.86	-0.86	0.30	Located within the Southwest Wellfield Complex; See Notes 1 and 3
G-553	98.77	93.02	-0.31	0.15	
G-580	99.38	94.87	0.03	0.23	
G-596	97.33	77.82	0.04	0.45	
G-618	100.00	100.00	0.24	0.07	
G-852	97.13	93.63	-0.002	0.38	
G-855	100.00	94.87	0.24	0.20	
G-858	97.54	63.24	-0.48	0.23	Located near the southern boundary; See Note 1
G-968	100.00	84.82	-0.22	0.27	See Note 2
G-970	99.18	91.38	-0.27	0.18	
G-972	84.36	16.67	-0.72	0.27	
G-973	100.00	98.36	0.10	0.14	
G-974	99.38	62.83	0.12	0.50	
G-975	74.95	33.88	-0.74	0.38	See Note 1
G-976	71.05	35.11	-0.74	0.46	See Note 1
NESRS1	94.46	89.12	0.04	0.40	Surface water station; located near the southwest boundary
NESRS2	94.05	72.90	0.10	0.45	Surface water station
NESRS3_B	100.00	66.60	-0.28	0.39	Surface water station
S-18	100.00	100.00	0.09	0.10	
S-19	100.00	95.07	0.14	0.18	
S-68	99.18	87.47	0.27	0.25	
SHARK.1_H	100.00	94.25	0.16	0.21	Surface water station

Note 1. A possible error occurred in the measuring point datum, or maximum daily measured water levels (published) may not be representative of end-of-day water levels (computed by the model and measured values not published).

Note 2. A discrepancy exists between the SFWMD and USGS surveyed elevation of the measuring point.

Note 3. A possible overestimation of pumping rates was made at nearby pumping well(s).

Note 4. The use of monthly pumpage rates may also be contributing to errors.

Recommendations and Conclusions

Model Capabilities and Limitations for Applications

The preceding discussions suggest that the model, in its current state, is adequate for comparative type analyses where water level based performance measures for various water supply alternatives are compared in order to select the most appropriate alternative(s) to undergo more detailed analyses. The locations of such performance measures should be within the evaluation area discussed previously. Furthermore, it is suggested that only water levels be used to formulate performance measures since all of the history matching work completed so far has been limited to water levels. Ground water flows and canal base flows computed by the model should be used with caution. In either case, it is recommended that the effect of uncertainties in model input on model based alternative comparisons be assessed prior to making any final decisions regarding alternative selections.

In addition to the caveats mentioned above, it should be emphasized that the eastern boundary of the model is based on a simplistic representation of the saltwater-freshwater interface within the SAS. The characteristics, position, and movement of this interface are all based on complex factors and principles (e.g., density-driven flow) that cannot be readily incorporated into a ground water flow model that only accounts for freshwater flow. Consequently, the model cannot directly support any performance measures that relate to, or are contingent upon, the shape, position, or movement of the saltwater wedge that, in reality, constitutes the eastern boundary of the ground water flow system.

Future Improvements

Certain improvements to the model are recommended in order to enhance its ability to support future applications. Such enhancements should include, but not necessarily be limited to, the following:

- The resolution of any outstanding data quality issues related to measured water levels (e.g., correcting errors in measuring point elevations)
- A Phase II calibration that addresses canal base flow and water budgets
- A sensitivity analysis of calibrated model results
- The incorporation of additional surface water modules that would allow canal stages and rainfall recharge to be simulated by the model
- An improved representation of the saltwater-freshwater interface located along the coastal boundary